

NIOSH PPT Program Evidence Package Aug 30, 2007

Appendix B [Back to the Appendices Table of Contents](#)

History of the PPT Program

Appendix B provides a tabulated history of the development of the NIOSH Personal Protective Technology Program. Highlights of PPT Program History include establishment of the National Personal Protective Technology Laboratory in Pittsburgh, PA. This occurred in FY 2001, when Congress allocated funds to establish a new program for personal protective technology and respirator research.

NIOSH PPT Program Evidence Package Aug 30, 2007
History of the PPT Program 1907 – Present

Highlights and Events Affecting the PPT Program Pre - 1977

YEAR	HIGHLIGHTS AND EVENTS
1907	Mine explosion and fire at Monongah, West Virginia which claimed 362 miners and prompted events that led to the creation of the U.S. Bureau of Mines (USBM)
1910	Creation of the USBM. The need for PPE for underground miners was recognized when the Bureau of Public Health and Marine Hospital Service assisted the USBM in an investigation of an Alabama mine explosion.
1916	A mine explosion in Bruceville, Indiana resulted in the first use of the Proto Apparatus by a mine rescue crew. In addition, upon the entry of the United States into World War I, the U.S. Army assigned the USBM responsibility for military research and production of respirators that resulted in an assortment of gas masks.
1917	In support of the war effort, the USPHS developed tests on methods of disinfecting clothing at a plant in Philadelphia, Pennsylvania. [1]
1918	Dr. Alice Hamilton (the first American physician to devote her life to the practice of industrial medicine) reported the first study on vibration-induced injuries and disorders in the United States.
1920	The Gibbs apparatus became the first respirator to be approved by the USBM.
1926	The USBM created a health and safety branch, and Surgeon R.R. Sayers from the USPHS with a history of assignment to the mine rescue cars was designated chief surgeon in charge of that branch. The branch included the responsibility for the development of respirators for use in industry as protection against various vapors and dusts and the approval of gas masks.
1931	The USPHS established an Office of Dermatoses Investigations. During World War II, this office helped the Army and Navy to design protective clothing for workers in hazardous trades. The USPHS assisted the War and Navy Departments in inspecting war industry factories as well as conducting related research that resulted in more than 100 confidential reports that included physiologic evaluation of oxygen breathing devices and combat clothing.
1961	A survey of health hazards by the USPHS regarding construction included suggestions for frequent washing of hands and body and changing of clothing and PPE including respirators, gloves, clothing, and eye guards.
1969	The 1969 Federal Coal Mine Health and Safety Act (Public Law 91-173) led to the creation of an advisory committee that was responsible for consulting with and making recommendation to the Secretary of the Interior on coal mining research.
1970	The Occupational Safety and Health Act of 1970 established NIOSH within DHEW (now DHHS). The act defined NIOSH role and responsibilities to conduct research, demonstrations and experiments for public health and occupational safety and health issues.[2]
1971	Occupational Safety and Health Administration (OSHA) created its basic personal protective equipment standard for general industry (29 CFR 1910.132). NIOSH describes crucial need to establish correct role of respiratory protection in the workplace.[3] First National Fire Protection Association (NFPA) consensus standard established for structural firefighting.
1972	First Particulate Respirator Approval via Schedule 21C (176 active approvals as of May 2007) NIOSH begins respiratory protection research activities and respirator certification. 30 CFR Part 11 was published and NIOSH began to co-certify respirators with the USBM.[4]
1973	First Self Contained Breathing Apparatus (SCBA) respirator approval (444 active approvals as of May 2007). First Supplied Air Respirator (SAR) approval (298 active approvals as of May 2007). First Chemical Cartridge Respirator Approval (1874 approvals as of May 2007).[5]
1974	First Gas Mask respirator approval (162 active approvals as of May 2007). Research was underway for improved test methods and equipment for approval testing of dust, fume, and mist respirators. Aspects of this research included more efficient face piece fitting, more efficient filtration of aerosols, lower breathing resistance, and a test panel of male and female human subjects having anthropometric specifications representing 95 percent of the U.S. working population.[6]
1975	NIOSH sponsored and organized the 2nd International Conference on Hand-Arm Vibration in Cincinnati, OH, which marked the beginning of a series of NIOSH's investigations on hand-arm vibration syndrome.
1976	First NFPA consensus standard for proximity firefighting (NFPA 1976). Self-contained self-rescuers, developed under interagency agreement with the USBM and proposed by MESA as replacements for current self rescuers, were tested by NIOSH in 1976.

NIOSH PPT Program Evidence Package Aug 30, 2007
History of the PPT Program 1907 – Present

Highlights and Events Affecting the PPT Program 1977 - 1996

YEAR	HIGHLIGHTS AND EVENTS
1977	<p>The Federal Mine Safety & Health Act of 1977 prescribed concentrations of respirable dust to be determined by the use of personal dust samplers and identified the use of respirators approved by the Secretaries of Labor and HHS for protection against respirable dusts. This act transitioned MESA advisory role under the 1969 Coal Act in DOI to more of an enforcement authority as MSHA under DOL.</p> <p>The Division of Safety Research (DSR) was established as part of NIOSH in Morgantown. This marked the first division-level focus on PPT research in NIOSH.[7]</p> <p>NIOSH Respirator Certification Program transferred to DSR.</p> <p>First NFPA consensus standard for wild land firefighting.</p>
1979	DSR published a list of certified equipment as of July 1, 1978. [7, 8]
1981	<p>The PPT program decided to focus its PPE research upon respirators and related technologies alone, and drop the testing of other PPE such as industrial and fire fighter helmets; safety glasses, goggles and face shields; gloves; industrial footwear; etc. Fiscal year 1981 was the last year a project addressing these devices was part of the NIOSH plan. [7, 8]</p> <p>MSHA/NIOSH approved 1 hr Self-Contained Self-Rescuers (SCSRs) that were deployed in underground coal mines in the United States..</p>
1984	<p>NIOSH engaged in PPE regarding hazardous waste sites in 1984. A mobile laboratory was renovated for Superfund activities and field studies.</p> <p>Chemical protective clothing for waste dump cleanup, projects were launched to validate two methods of testing for chemical resistance. Three field test methods were adapted from American Society for Testing Materials methods for chemical degradation, chemical penetration, and chemical permeation. Tests adopted for CPC from ASTM.</p>
1987	<p>PPT leadership began developing an internal implementation strategy for the “Proposed National Strategy” for severe occupational traumatic injury. An analysis of the proposed national occupational injury strategy and realignment of existing and creation of new occupational injury program areas were conducted. The set of program areas identified for the severe occupational traumatic injury program included: [7, 8]</p> <ul style="list-style-type: none"> • Agriculture/pesticides • Certification • Chemical Protective Clothing (CPC) • Construction • Dissemination • Industrial Machine Safety • Musculoskeletal Injuries • Personal Protective Equipment • Respirator Research • Surveillance • Trauma Epidemiology <p>This list is noteworthy for its identification of major high-risk sectors (agriculture and construction) as a focus for programmatic thinking, for the inclusion of high-risk topics such as machine safety and acute musculoskeletal injury (which have consistently been priority areas from the inception of the PPT program to the present), and a growing awareness that trauma epidemiology and dissemination of risk and prevention information represented major gaps in the existing PPT program.</p> <p>NIOSH proposed a comprehensive revision of certification standards under 42 CFR 84. Comments were so substantial that the PPT program decided to implement a modular approach to updating the standards.[5]</p>
1989	NIOSH published a criteria on hand-transmitted vibration exposure.
1991	To evaluate the protection provided by a class of respirators commonly used in lead or other hazardous airborne contaminant work in 1991, NIOSH researchers measured in-facepiece respirator concentrations at two lead-acid battery manufacturing facilities.
1992	ANSI Z359 - First ANSI Fall Protection Standards introduced.[8]

NIOSH PPT Program Evidence Package Aug 30, 2007
History of the PPT Program 1907 – Present

YEAR	HIGHLIGHTS AND EVENTS
1993	<p>When NIOSH was just beginning to plan for a new laboratory facility in Morgantown, occupational injury developed a strategic plan for protective technology research, which largely focused upon the programs it still managed in respiratory testing, certification, and research; and chemical protective clothing (CPC).</p> <p>In January, the Director of the Division of Safety Research developed a plan entitled “A Protective Technology Research Program for the 1990s.” This plan outlined a research plan comprising three levels of technologies and programs to include: Basic Protective Technologies, Enhanced Protective Technologies, and Advanced Protective Technologies.</p>
1994	<p>CDC Guidelines for the prevention of MTb in healthcare settings provided recommendation for respirators at least 95% efficient against 1 micron particle.</p>
1995	<p>DHHS (NIOSH) publishes 42 CFR 84 respirator approval regulations to provide more protective respirator types.[5]</p> <p>First Particulate Filter Respirator Approval via Schedule 84A (3893 active approvals as of May 2007).</p> <p>All respirator approvals were issued jointly by the MSHA and NIOSH until 1995, when the approval requirements for respiratory protection devices were transferred to Title 42, Public Health, of the Code of Federal Regulations. Under the DHHS respirator approval regulations (42 CFR part 84), NIOSH is the sole approving authority for most respirators. Specifically, the rule replaces MSHA regulations at 30 CFR part 11 with new public health regulations at 42 CFR part 84, while also upgrading testing requirements for particulate filters. Concurrently with publication by NIOSH of this new rule, MSHA published a final rule to remove existing regulations at 30 CFR part 11, which are made obsolete by this final rule. NIOSH now has exclusive authority for testing and certifying respirators with the exception of certain mine emergency devices, which continue to be jointly certified by NIOSH and MSHA.[4, 5]</p>
1996	<p>NIOSH unveils the first decade of National Occupational Research Agenda (NORA).</p> <p>USBM mine safety and health research activities were transferred to NIOSH.</p> <p>NIOSH Respirator certification program transferred from Division of Safety Research (DSR) to the Division of Respiratory Disease Studies (DRDS).</p> <p>Development of a new standard protocol for estimating the field effectiveness of hearing protection devices, Part I: Research of Working Group II, Accredited Standards Committee S12, Noise. Journal of the Acoustical Society of America, 1996. The inter-laboratory results first described by Royster et al. were the basis for several national and international regulations, standards and recommendations on evaluating hearing protection devices.</p> <p>Labor, Health and Human Services and Education Appropriations Senate Committee Report NIOSH is urged to process respirator certification applications within 90 days of submission to ensure workers have access to new, more protective technology.</p>

NIOSH PPT Program Evidence Package Aug 30, 2007
History of the PPT Program 1907 – Present

Highlights and Events Affecting the PPT Program 1997 - 2000

YEAR	HIGHLIGHTS AND EVENTS
1997	<p>NIOSH conducted a systematic review of Musculoskeletal Disorders and Workplace Factors and published the review report, which includes a chapter on hand-arm vibration syndrome.</p> <p>The Health and Safety Research Program at the USBM was permanently transferred to the NIOSH, including hearing protection research and the long term field evaluation program.</p> <p>NIOSH Five Year Strategic Plan developed covering 1997-2002.</p>
1998	<p>NIOSH Control of Workplace Hazards for the 21st Century Conference conducted with over 250 researchers, manufacturers, and stakeholders to set the research Agenda for Personal Protective Equipment (PPE) and engineering controls.</p> <p>The MHRAC committee's name was changed to include safety, thus resulting in the name Mine Safety and Health Research Advisory Committee (MSHRAC). A two-year charter for MSHRAC was established in 1998. MSHRAC has conducted at least seven meetings since 1998, with the last meeting occurring during May 2006.</p> <p>Criteria for a Recommended Standard - Occupational Noise Exposure Revised Criteria, NIOSH document 98-126, 1998. This document broke new ground in key aspects of a recommended standard, e.g. the recommendation of 85 dB(A) as the Recommended Exposure Limit (REL), along with a 3 dB exchange rate. The Criteria Document has had a strong influence on policies and practices in other governmental agencies and professional organizations, including DOD, NASA, AAA, and the Council for Accreditation in Occupational Hearing Conservation.</p> <p>In combination with the American Industrial Hygiene Association and the American Society of Safety Engineers, the PPT Program held a unique workshop and conference entitled, "The Control of Workplace Hazards for the 21st Century: Setting the Research Agenda" in Chicago in March 1998. It brought together more than 250 researchers, manufacturers, and users of engineering controls and personal protective equipment.</p>
1999	<p>NIOSH-DOD-OSHA Sponsored Chemical and Biological Respiratory Protection Workshop conducted March 10-12, 1999 provided a forum for over 140 representatives from 63 organizations to discuss issues and exchange information and learn about current respiratory protection issues associated with incidents involving chemical and biological agents. NIOSH-DOD-OSHA Sponsored Chemical and Biological Respiratory Protection Workshop DHHS (NIOSH) Publication No. 2000-122. [9]</p> <p>PPT Program management served as the first co-chair of the Interagency Board Standards Coordination Committee. The IAB is a user-working group supported by voluntary participation from various local, state, federal govt. and private organizations. The mission of the IAB is to establish and coordinate local, state, and federal standardization, interoperability, compatibility and responder health and safety to prepare for, train, and respond to, mitigate and recover from any incident by identifying requirements for an all-hazards incident response with a special emphasis on chemical, biological, radiological, nuclear, or explosive (CBRNE) issues.</p>
2000	<p>In fiscal year (FY) 2001, the U.S. Congress allocated funds to develop standards and technologies for protecting the health and safety of America's workers who rely on personal protective equipment (PPE), such as respirators, clothing, gloves, hard hats, and eye and hearing protective devices. The Centers for Disease Control and Prevention (CDC) and NIOSH established the National Personal Protective Technology Laboratory (NPPTL) in Pittsburgh, PA to provide national and world leadership for improved PPT. Creation of NPPTL in 2001 consolidated the Congressionally mandated respirator certification program, with respiratory protection research and standards development activities. The establishment of NPPTL began an initiative to align all PPT activities.</p>

NIOSH PPT Program Evidence Package Aug 30, 2007
History of the PPT Program 1907 – Present

Highlights and Events Affecting the PPT Program 2001 – 2005

YEAR	HIGHLIGHTS AND EVENTS
2001	<p>ANSI/AIHA Z88.10-2001 Respirator Fit Test Methods Consensus Standard published.</p> <p>September 11, 2001 terrorist attacks on WTC and Pentagon.</p> <p>Fall 2001 Anthrax scare.</p> <p>The NPPTL Leadership conducted a meeting September 13, 2001 with 16 key stakeholders to align ongoing PPT research activities with the stakeholder needs</p> <p>At the November 1, 2001 MSHRAC meeting, PPT Program management gave a presentation on the new NPPTL which included the strategic goals, project overviews, and an overview of the respirator certification program.</p> <p>A RAND Project Memorandum (PM-1228-NIOSH) titled “Development of an Institutional Planning Process for the National Personal Protective Technology Laboratory” was used as the starting point for the strategic planning effort.</p> <p>NPPTL conducted a series of Training Seminars for all NPPTL employees. These seminars served the dual purpose of educating/training all employees in the director’s vision for the Laboratory, while simultaneously obtaining employee input on critical issues to be addressed. Three Training Seminars were arranged and conducted, one of which included the participation of Dr. John Howard, NIOSH Director.</p> <p>In addition to these Seminars, more than 60 face-to-face meetings were held with the Laboratory’s senior planner and/or Director in order to align current PPT initiatives with stakeholder needs.</p>
2002	<p>NPPTL renovated buildings as a temporary solution to establishing laboratory facilities and developed standards for CBRN SCBA.</p> <p>FEMA Assistance to Firefighters Grant Program allocated \$900 million per year for three years to protect health and safety of public firefighting personnel against fire hazards.</p> <p>First CBRN SCBA respirator approval (36 active approvals as of May 2007).</p> <p>IAB adopts NIOSH PPT Program Open Circuit CBRN SCBA Standard.</p> <p>At the November 7, 2002 MSHRAC meeting, the PPT Program management provided an introduction to the NPPTL and an update on the self contained self-rescuer initiative. Other topics discussed at the meeting included partnerships, selected program accomplishments, and an overview of PPT programs directly related to mining (SCSR LTFE, breathing & metabolic simulator, SCSR research & standards development, and SCSR training.</p> <p>NIOSH established a laboratory research program in Morgantown, West Virginia, to conduct the study of the hand-transmitted vibration exposure and health effects, which included the vibration isolation using anti-vibration gloves.</p>
2003	<p>Labor, Health and Human Services and Education Appropriations Senate Committee Report, provided additional funds for the NPPTL to be used, in part, to expedite research and development in, and certification of, protective equipment for use against the hazards of terrorist agents.</p> <p>NPPTL completed renovation of ten existing structures on Bruceton, PA facility to house laboratories and staff.</p> <p>Self-contained self-rescuer program transferred from PRL to NPPTL.</p> <p>IAB adopts NIOSH PPT Program Standard for CBRN Full-Facepiece APR.</p> <p>IAB adopts NIOSH PPT Program Standard for CBRN Air Purifying Escape Respirator (APER) and CBRN Self-contained escape respirator.</p> <p>NIOSH web-based hearing protector compendium. [http://www.cdc.gov/niosh/topics/noise/hpcomp.html]</p>

NIOSH PPT Program Evidence Package Aug 30, 2007
History of the PPT Program 1907 – Present

YEAR	HIGHLIGHTS AND EVENTS
2004	<p>Labor, Health and Human Services and Education Appropriations Senate Committee Report NPPTL was to expedite research and development in, and certification of, protective equipment, such as PAPRs, and combined SCBA/escape sets.</p> <p>NIOSH begins a year-long initiative to conduct public meetings across the nation to obtain stakeholder input into the second decade of NORA.</p> <p>First CBRN Air Purifying Respirator (APR) approval (eight active approvals as of May 2007).</p> <p>NIOSH researchers published a study on vibration power absorption (Vibration Energy Absorption in Human Fingers-Hand-Arm System. Medical Engineering & Physics 26(7), 2004: 483-492.). This study changed the traditional concept on vibration power absorption of the hand-arm system and led to the development of a new vibration exposure theory. The new concept started to affect the development of personal protecting device for reducing vibration exposure.</p>
2005	<p>The National Academy of Sciences conducts the first meeting with the PPT Program sponsored Committee on PPE for the Workforce (COPPE) on November 2, 2005 to be conducted three times annually as part of the PPT Program effort to maximize the quality, relevance, and impact of PPT activities</p> <p>The National Academy of Sciences conducts the first meeting with the PPT Program sponsored Committee to Assess the NIOSH Head-and-Face Anthropometrics Survey of U.S. Respirator Users on November 3, 2005 in an effort to validate the recommended changes to the current respirator panel.</p> <p>The National Academy of Sciences conducts the first meeting with the PPT Program-sponsored Committee to Review the NIOSH BLS Respirator Use Survey.</p> <p>The formation of a Baldrige Category team focused on the design of an effective strategic planning process began implementation in FY 2006. The key process steps include analysis of input from stakeholders, technology developers and providers, user communities and the environmental assessment.</p>

NIOSH PPT Program Evidence Package Aug 30, 2007
History of the PPT Program 1907 – Present

Highlights and Events Affecting the PPT Program 2006 – Present

2006	<p>ANSI/AIHA Z88.6-2006 Respiratory Protection - Respirator Use - Physical Qualifications for Personnel Consensus Standard published.</p> <p>An explosion at West Virginia SAGO mine caused the entrapment, and consequently, the deaths of 12 miners.</p> <p>Two mine workers died in a January 19, 2006 fire at Massey Energy's Aracoma mine.</p> <p>Five miners died in a May 20, 2006, explosion.</p> <p>British Standards Institute adopts NIOSH PPT Program CBRN SCBA Standard.</p> <p>NIOSH Statement of Standard for CBRN PAPR.</p> <p>At the May 23-24, 2006 MSHRAC Meeting, the PPT Program Manager gave a presentation on SCSR research that included SCSR history, SCSR operation, lessons learned, and the evolving revision to the LTFE program.</p> <p>NIOSH launched the second decade of NORA.</p> <p>Congressional direction: The Committee has provided \$500,000 above the fiscal year 2006 level of funding for the NIOSH NPPTL to expedite research and development in, and certification of, protective equipment, such as powered air purifying respirators, and combined self-contained breathing apparatus/escape sets. The Committee encourages NIOSH to consider the value of a study to evaluate all classes of disposable NIOSH approved respirator facemasks, including but not limited to particulate and antimicrobial technology for effectiveness against transmission of avian influenza and other pathogens.</p> <p>The Mine Improvement and New Emergency Response Act of 2006 (Miner Act) explicitly stated the following language:</p> <ul style="list-style-type: none"> • Post-accident electronic tracking to provide current or immediately pre-accident location of all underground personnel to ground personnel, consistent with technology and physical constraints, r alternative within 3 yrs • Aggregate of no less than 2 hrs per miner, SCSR caches at a distance no further than a 30 minute walk for an average miner • 2 hours of breathable air per miner required by emergency temporary standard • Maintenance schedule for reliability of self-rescuers and introduction of new technology • Training in donning, switching units and proper fit
2007	<p>NFPA 1981 Standard on Open-Circuit Self-contained Breathing Apparatus (SCBA) for emergency services (2007 edition) requires NIOSH certification for protection against CBRN hazards as a pre-condition fro NFPA certification.</p>

References

1. Gordon, J., *The epidemiology of injuries as a basis for public policy*. Public Health Reports, 1949. **5**: p. 411-21.
2. NIOSH, *NIOSH and "Safety" in The Advisor, Number 1 (July 1, 1972)*. 1972a, National Institute for Occupational Safety and Health: Rockville, MD. p. 6.
3. Code of Federal Regulations 29 CFR 1910.132, *Title 29 Labor, Part 1910.132 - Occupational Safety and Health Standards-Personal Protective Equipment*, in http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9777. 2003: U.S. Government Printing Office, Office of the Federal Register, Washington, DC.
4. Code of Federal Regulations 30 CFR 11, *Title 30, CFR, Part 11 - Respiratory protection*. 1972: U.S. Government Printing Office, Office of the Federal Register, Washington, DC.
5. Code of Federal Regulations 42 CFR 84, *Title 42: Public Health, Part 84 - Approval of Respiratory Protective Devices*. 2007, U.S. Government Printing Office, Office of the Federal Register, Washington, DC.
6. Arthur D. Little Inc., *Final Report relating to the Present Status and Requirements for Occupational Safety Research, prepared for the National Institute for Occupational Safety and Health, Health Services and Mental Health Administration, Public Health Service*, in *Contract No. HSM 099-71-30*. 1972, A.D.Little: Cambridge, MA. p. 203.
7. Stout, N. and H. Linn, *From Strategy to Reality: 25 Years of Planning and Progress in Occupational Injury Research*. Injury Prevention, 2001. **7**(Suppl I): p. i11-14.
8. Stout, N. and H. Linn, *Occupational Injury Prevention Research: Progress and Priorities*. Injury Prevention, 2002. **8**(Suppl IV): p. iv9-iv14.
9. NIOSH, *NIOSH-DOD-OSHA Sponsored Chemical and Biological Respiratory Protection Workshop, March 10-12, 1999*, in *DHHS (NIOSH) Publication No. 200-122*, <http://www.cdc.gov/niosh/2000-122.html>. 2000, National Institute for Occupational Safety and Health: Morgantown, WV.

This page intentionally left blank